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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/756,686	01/09/2001	Kazuo Matsuzaki	FUJI:179	4650

7590

09/24/2002

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EXAMINER

LOKE, STEVEN HO YIN

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 09/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/756,686		Applicant(s) MATSUZAKI ET AL.	
	Examiner Steven Loke		Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 15-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>6</u> | 6) <input type="checkbox"/> Other: _____ |

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1. Applicant's election without traverse of claims 1-14 in Paper No. 11 is acknowledged.

2. Claims 15-28 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 11.

OK 3. Figures 21, 22(a), 22(b), 23, 24(a) and 24(b) should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP§608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The disclosure is objected to because of the following informalities:

OK In page 18, line 10, "Fig. 24" is unclear whether it is being referred to "Figs. 24(a) and 24(b)".

OK
In drawing
correction → There is no reference numeral 159a (page 23, line 15) in fig. 13.

OK There is no reference numeral 153c (page 27, line 8) in fig. 14(b).

OK It is unclear whether region 164 is an n-type well (page 27, line 17) or a p-type well (page 27, line 19).

OK In page 29, line 4, it is unclear which sub-region has a surface boron concentration of about $5 \times 10^{16} \text{ cm}^{-3}$.

OK In page 35, line 5, "mor" is unclear whether it is being referred to "more".

Appropriate correction is required.

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5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-12 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kitamura et al. (U. S. patent no. 5,705,842).

In regards to claim 1, Kitamura et al. shows all the elements of the claimed invention in fig. 7. It is a semiconductor device exhibiting a high breakdown voltage, comprising: a first region [2] of a first conductivity type (n-type); a second region [31] (region [31] on the left side of the gate electrode [7]) of a second conductivity type (p-type) formed selectively in the surface portion of the first region; a third region [8] of the first conductivity type formed selectively in the surface portion of the first region, the second region [31] and the third region [8] being spaced apart from each other; a fourth region [5] of the first conductivity type formed selectively in the surface portion of the second region; a fifth region [3, 31 (region [31] formed on the right side of the gate electrode [7]), 4] of the second conductivity type formed selectively in the surface portion of the first region [2] between the second region [31] and the third region [8]; a first insulation film [6] on the fifth region; a gate electrode [7] above the extended portion of the second region [31] extending between the fourth region [5] and the first region [2] with a gate insulation film [6] interposed between the extended portion of the second region [31] and the gate electrode [7]; a first main electrode [11] on the fourth region [5]; and a second main electrode [12] on the third region [8]; wherein the fifth region [3, 31, 4]

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comprises a plurality of sub-regions [3, 31, 4] aligned between the second region [31] and the third region [8], the impurity concentrations of the sub-regions [3, 31, 4] being different from each other.

In regards to claim 4, Kitamura et al. shows all the elements of the claimed invention in fig. 7. It is a semiconductor device exhibiting a high breakdown voltage, comprising: a semiconductor substrate (p-) of a second conductivity type (p- type); a first region [2] of a first conductivity type (n-type) formed selectively in the surface portion of the semiconductor substrate; a second region [31] (region [31] on the left side of the gate electrode [7]) of a second conductivity type (p-type) formed selectively in the surface portion of the semiconductor substrate; a third region [8] of the first conductivity type formed selectively in the surface portion of the first region, the second region [31] and the third region [8] being spaced apart from each other; a fourth region [5] of the first conductivity type formed selectively in the surface portion of the second region; a fifth region [3, 31 (region [31] formed on the right side of the gate electrode [7]), 4] of the second conductivity type formed selectively in the surface portion of the first region [2] between the second region [31] and the third region [8]; a first insulation film [6] on the fifth region; a gate electrode [7] above the extended portion of the second region [31] extending between the fourth region [5] and the first region [2] with a gate insulation film [6] interposed between the extended portion of the second region [31] and the gate electrode [7]; a first main electrode [11] on the fourth region [5]; and a second main electrode [12] on the third region [8]; wherein the fifth region [3, 31, 4] comprises a plurality of sub-regions [3, 31, 4] aligned between the second region [31] and the third

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region [8], the impurity concentrations of the sub-regions [3, 31, 4] being different from each other.

In regards to claims 2, 5, Kitamura et al. further discloses the depths of the sub-regions of the fifth regions [3, 31, 4] are different from each other.

In regards to claims 3, 6, Kitamura et al. further discloses the gate electrode [7] is extended onto the first insulation film [6].

In regards to claims 7, 8, Kitamura et al. further discloses the impurity concentration of the sub-region [31] on the side of the second region [31] is higher than the impurity concentration of the sub-region [4] on the side of the third region [8].

In regards to claims 9, 10, Kitamura et al. further discloses the diffusion depth of the sub-region [31] on the side of the second region [31] is deeper than the diffusion depth of the sub-region [4] on the side of the third region [8].

In regards to claims 11, 12, Kitamura et al. further discloses the impurity concentration of the sub-region [3, 31, 4] is the concentration of an impurity of the second conductivity type (p-type).

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura et al.

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In regards to claims 13 and 14, Kitamura et al. differs from the claimed invention by not showing the surface impurity concentration of the fifth region of the second conductivity type is changed by adding an impurity of the first conductivity type, the amount thereof being less than the amount of the impurity of the second conductivity type in the fifth region.

It would have been obvious for the surface impurity concentration of the fifth region of the second conductivity type is changed by adding an impurity of the first conductivity type and the amount thereof being less than the amount of the impurity of the second conductivity type in the fifth region because it is one of the old and well known methods to make the device.

The process limitation of how the fifth region is formed has no patentable weight in claim drawn to structure. It is important to note that there are many ways to make the fifth region of the second conductivity type. Therefore, the phrase "the surface impurity concentration of the fifth region of the second conductivity type is changed by adding an impurity of the first conductivity type, the amount thereof being less than the amount of the impurity of the second conductivity type in the fifth region" is thus non-limiting.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (703) 308-4920. The examiner can normally be reached on 7:50 am to 5:20 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers

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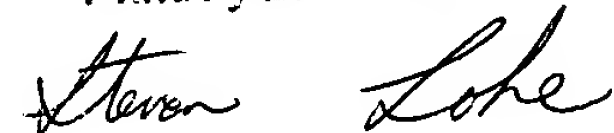
for the organization where this application or proceeding is assigned are (703) 308-7722

for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

sl
September 23, 2002

Steven Loke
Primary Examiner

A handwritten signature in cursive script, appearing to read "Steven Loke", written in black ink.